

Clipton, 11. *Texas*.—Arthur City, 6.5. *Utah*.—Scofield, 18.2; Castle Gate, 15.8; Grouse Creek, 14.1; Richfield, 14; Heber, Lake Park, and Promontory, 13; Levan, 12.8; Blue Creek, 12.5; Kelton and Terrace, 12.

Vermont.—Jacksonville, 23.2; Chelsea, 18; Brattleboro, 16; Irasburg, 15.5; Strafford, 15; Woodstock, 14; Vernon, 13.5; Hyde Park, 13.2; Northfield and Hartland, 12.7; Norwich and Saxtons River, 12; Wells, 11; Simonsville, 10. *Virginia*.—Marion, 30; Abingdon, 27; Emporia, 24; Richmond (a), 21.5; Spottsville, 21; Big Stone Gap and Wytheville, 20; Ashland and Cape Henry, 17; Birdsnest, 15.4; Norfolk, 13.7; Petersburg, 13.5; Clarksville, 13; Danville and Warsaw, 12.5; Bedford City and Staunton, 12; Hot Springs, 11.5; Nottoway, 10.

Washington.—Port Angeles, 33.2; Port Crescent, 32.4; Vashon, 28.5; Aberdeen, 26; Madrone, Pine Hill, and Tacoma, 20; Silver Creek, 19; Fort Spokane, 18.1; Seattle, 15; Chehalis, 14; Centralia, 13.9; Olympia, 13.7; Fort Townsend, 13.2; Fort Canby, 11.6; Colfax, 11.5; Fort Simcoe and Waterville, 10. *West Virginia*.—Kingwood, 30; Rowlesburg, 27; Grafton, 25.2; Nuttallburg, 24; Parkersburg, 23.6; Charleston (a) and Glenville, 23; Buckhannon (a), 22.1; Elkhorn, 22; Davis and New Martinsville, 21; Bluefield, 20; Spencer, 19; Morgantown (b), 18.6; Philippi, 18; Point Pleasant, 17.8; Fairmont, Morgantown (a), and Wheeling (a), 17; Tannery, 15.5; Central Station and Wheeling (b), 15; Ella and Huntington, 14.

Wisconsin.—Columbus, 28; Depere, 25.8; Prairie du Chien, 22; Koepenick and Oshkosh, 21; Rhinelander, 20; Lancaster, 19.7; New Holstein, 19.6; Chippewa Falls, 19; Weston, 18.5; Fond du Lac and Hudson, 18; Amherst and Green Bay, 17.5; Crandon, 17.4; Manitowoc, 17.3; Grantsburg, 17.2; Beloit, Hammond, Hillsboro, and Osceola, 17; Westfield, 16.8; Oconomowoc and Raymond, 16.5; Oconto, 16.4; Valley Junction, 15.8; Waukesha, 15.6; Baraboo, 15.5; Wauertown, 15.2; Sparta (b), 15; Madison, 14.8; La Crosse, 14.6; Menomonie, 14.3; Meadow Valley and Portage, 14; Black River Falls and Harvey, 13.8; Sharon, 13.5; Reedsburg, 13.4; Beaver Dam and Shawano, 13.2; Eau Claire (a), 13.1; Bayfield, 12.6; Appleton and Barron, 12.5; Cadiz, 12.4; Janesville, 12.2; Pepin, 11.8; Mineral Point and Shell Lake, 11; Milwaukee, 10.7; Delavan and Viroqua, 10. *Wyoming*.—Fort Yellowstone, 18.4; Evanston, 13.

SLEET.

Description of the more severe sleetstorms is given under "Local storms." Sleet was reported as follows: 1st, Connecticut, Illinois, Kansas, Maryland, Massachusetts, Michigan, Mississippi, Missouri, New Hampshire, New Jersey, New

York, North Dakota, Ohio, Pennsylvania, Vermont, and Virginia. 2d, Illinois, Maryland, Pennsylvania, Tennessee, and Vermont. 3d, North Carolina and Tennessee. 4th, Montana, North Dakota, and South Dakota. 5th, Nebraska. 6th, Kansas, Missouri, Nebraska, and South Dakota. 7th, Alabama, Illinois, Kentucky, Nebraska, and South Dakota. 8th, Alabama and Kentucky. 9th, Alabama, Illinois, Indiana, and Missouri.

10th, Kansas, Kentucky, Missouri, New Jersey, and Washington. 11th, Georgia, Illinois, Kentucky, Mississippi, North Carolina, and Tennessee. 12th, Georgia, Illinois, Kansas, Kentucky, Massachusetts, Missouri, North Carolina, South Carolina, and Tennessee. 13th, Georgia. 14th, Alabama, Georgia, Louisiana, Mississippi, Missouri, and Tennessee. 15th, Georgia, Nevada, Oregon, and Virginia. 16th, Nevada and Oklahoma. 17th, Florida, Georgia, Illinois, Louisiana, Michigan, Mississippi, South Dakota, and Texas. 18th, Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, Missouri, North Carolina, South Carolina, and Texas.

19th, Alabama, Florida, Georgia, Louisiana, Mississippi, Missouri, South Carolina, and Texas. 20th, Michigan, Missouri, North Dakota, and South Carolina. 21st, Michigan, Missouri, and Oregon. 22d, Illinois, Michigan, Missouri, Washington, and Wisconsin. 23d, Iowa. 24th, Illinois, Indiana, Michigan, Oregon, Virginia, and West Virginia. 25th, Illinois, Kansas, Michigan, Missouri, Nebraska, Oregon, Pennsylvania, and Washington. 26th, Illinois, Indiana, Indian Territory, Kansas, Missouri, Nebraska, Oklahoma, and Oregon. 27th, California, Illinois, Indiana, Indian Territory, Iowa, Kansas, Michigan, Missouri, Nevada, New Jersey, New York, Ohio, Oklahoma, Oregon, Pennsylvania, and Wisconsin.

28th, California, Connecticut, Illinois, Iowa, Kansas, Maine, Maryland, Massachusetts, Michigan, Missouri, New Hampshire, New Jersey, New York, Ohio, Oregon, and Wisconsin. 29th, Arkansas, Connecticut, Iowa, Kansas, Maine, Maryland, Massachusetts, Michigan, Missouri, New Hampshire, New Jersey, New York, Ohio, Oregon, Pennsylvania, Vermont, Washington, and Wisconsin. 30th, California, Colorado, Illinois, Indiana, Iowa, Kansas, Maryland, Michigan, Missouri, Nevada, New Jersey, Ohio, Oregon, and West Virginia. 31st, Colorado, District of Columbia, Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, New Jersey, New York, Ohio, South Dakota, Utah, Washington, and Wisconsin.

HAIL.

Hail was reported on the 10th in Oregon; on the 12th in Alabama and North Carolina; on the 27th in California; and on the 28th in Kansas.

WINDS.

The prevailing winds in January, 1893, are shown on Chart II by arrows flying with the wind. In New England and the upper Mississippi valley, and on the middle-eastern slope of the Rocky Mountains, the winds were generally from west to north; in the middle Atlantic states, and on the south Pacific coast, from the northwest; in the south Atlantic and east Gulf states, the Ohio Valley and Tennessee, the Lake region, and on the northeast slope of the Rocky Mountains, from southwest to northwest; over the Florida Peninsula, from northwest to northeast; in the Missouri Valley, from northwest to north; over the middle plateau region, from northeast to southeast; over the northern plateau region, from southeast to south; along the north Pacific coast, from east to south; along the middle Pacific coast, from the southeast; and in the west Gulf states, on the southeast slope of the Rocky Mountains, and over the southern plateau, variable.

HIGH WINDS (in miles per hour).

Wind velocities of 50 miles, or more, per hour were reported at regular stations of the Weather Bureau as follows: 1st, 80, nw., at Pikes Peak, Colo.; 50, se., at New London, Conn.; 50, s., at Kittyhawk, N. C. 2d, 60, se., at Woods Holl, Mass.; 52, s., at Boston, Mass. 3d, 52, sw., at Havre, Mont.; 50, sw., at Amarillo, Tex. 5th, 60, ne., at Block Island, R. I. 6th, 70, ne., at Block Island, R. I.; 68, e., at Tatoosh Island, Wash.; 54, nw., at Kearney, Nebr. 7th, 57, e., at Tatoosh Island, Wash. 10th, 98, w., at Pikes Peak, Colo.; 51, nw., at Woods Holl, Mass. 11th, 54, nw., at Kearney, Nebr.; 52, n., at Bismarck, N. Dak.; 50, nw., at Dodge City, Kans. 13th, 96, w., at Pikes Peak, Colo.; 51, nw., at Colorado Springs, Colo.; 50, w., at Cheyenne, Wyo. 14th, 72, e., at Tatoosh Island, Wash.; 68, se., at Fort Canby, Wash. 15th, 76, e., at Tatoosh Island, Wash.; 66, se., at Fort Canby, Wash. 19th,

52, ne., at Kittyhawk, N. C. 25th, 60, e., at Tatoosh Island, Wash. 26th, 80, w., at Pikes Peak, Colo.; 72, se., at Tatoosh Island, Wash. 27th, 96, w., at Pikes Peak, Colo.; 54, w., at Cheyenne, Wyo.; 54, sw., at Winnemucca, Nev.; 52, sw., at Amarillo, Tex. 28th, 56, e., at Tatoosh Island, Wash.; 50, sw., at Amarillo, Tex. 29th, 84, sw., at Pikes Peak, Colo.; 59, sw., at Buffalo, N. Y. 30th, 58, nw., at Tatoosh Island, Wash.; 57, sw., at Colorado Springs, Colo.; 54, w., at Fort Canby, Wash. 31st, 60, w., at Huron, S. Dak.; 60, sw., at Idaho Falls, Idaho; 58, sw., at Colorado Springs, Colo.; 56, sw., at Amarillo, Tex.; 55, e., at Tatoosh Island, Wash.; 52, nw., at Moorhead, Minn.

LOCAL STORMS.

1st-2d.—At New London, Conn., light rain, with a south-east gale reaching a velocity of 50 miles per hour, prevailed during the 1st. At Southington, Conn., snow began 8 a. m., 1st, and changed to rain 1 p. m., with a heavy southeast gale at night; roads were badly washed and river meadows were flooded. At Blue Hill Observatory, Mass., the gale was reported the severest on record. At Billerica, Mass., a heavy southeast gale, with snow, sleet, and rain, prevailed. On the 2d the wind reached a velocity of 60 miles per hour from the southeast at Woods Holl, Mass., and a velocity of 52 miles per hour from the south was recorded at Boston, Mass. High wind caused damage of a minor character at Portland, Me.

5th.—In the evening high wind caused some damage at Chattanooga, Tenn. High northwest winds prevailed over Lake Michigan.

5-6th.—Northeast gales prevailed along the middle Atlantic and New England coasts, causing considerable damage to seaside property on Long Island and in New Jersey. On the southeast New England coast wind velocities of 60 to 70 miles per hour were reported. High northwest winds continued off the south New England, Long Island, and New Jersey coasts until the morning of the 7th.

8-9th.—High winds set in over the upper lakes. At Grand Haven, Mich., the wind caused an accumulation of ice which extended several miles from the shore. A northwest gale prevailed over Lake Erie during the 9th.

10-11th.—High northwest winds prevailed over the middle Atlantic and south New England states.

14-15th.—At Fort Canby, Wash., the wind increased in squalls from the southeast, and at 11.20 p. m., 14th, reached an extreme velocity of 110 miles. The gale continued until about noon of the 15th, and reached an extreme velocity of 120 miles per hour at 2.20 a. m., 15th. Several houses were blown down, trees were uprooted and broken off, and telegraph lines were prostrated. At Tatoosh Island, Wash., the maximum wind velocity was 72 miles on the 14th, and 76 miles per hour from the east on the 15th.

17th.—A destructive windstorm was reported at Highlands, about 50 miles east of Los Angeles, California.

19th.—At Jupiter, Fla., a thunderstorm prevailed from 1 to 3.04 p. m.; the wind reached a velocity of 33 miles per hour from the south, causing boats to drag their anchors.

24th.—At Key West, Fla., the barometer fell in the morning. From 1.30 to 2 p. m. the wind was variable. At 2 p. m. the wind began to increase from the north, and reached a velocity of 48 miles per hour at 3.05 p. m. From 2 to 3 p. m. the gale was attended by heavy rain and thunder at intervals.

30th.—At Heber, Utah, a thunderstorm prevailed from 10 p. m. until midnight. At 11 p. m. a violent storm from the southwest moved northeast over the town, leveling buildings, etc., in a path about 30 rods in width. On the 30th-31st a southwest gale damaged buildings at Montrose, Colo.

31st.—A northwest gale, with heavy snow and very low temperature, prevailed at Fort Buford, N. Dak. Westerly gales prevailed generally along the eastern Rocky Mountain slope and in the Northwest.

INLAND NAVIGATION.

ICE IN RIVERS AND HARBORS AND CLOSING OF NAVIGATION.

At Portland, Me., ice formed in the lower bay on the 14th for the first time since 1884; 19th, ice partly broken by warmer weather; navigation not interrupted. Great floes of ice interfered with navigation in Boston harbor from the 11th to the 13th. At Vineyard Haven, Mass., the harbor was frozen on the 12th; 17th, steamer "Monohansett" failed to get out of Edgartown harbor on account of ice; revenue cutter "Dexter" also ice bound; 20th, steamer "Nantucket" came through ice; 27th, steamer "Edgartown" broke through the ice. At New London, Conn., the Connecticut River was frozen over on the 11th; on the 16th navigation between New London and Norwich was closed. Ice in the rivers and harbor at New York interfered with navigation at intervals during the month. At Baltimore, Md., navigation, except for large steamers, was seriously interfered with by ice from the 17th to the 22d. On the latter-named date ice boats cut a channel for five delayed ocean steamers, and the ice blockade in Baltimore harbor was practically broken. On the 16th a large field of ice was encountered off Absecon, N. J. On the 17th field ice was reported about Barnegat, N. J., and heavy ice was encountered about the Delaware Breakwater and in the Delaware River. Heavy ice was reported in Delaware Bay until the last of the month. On the 22d Chesapeake Bay and tributaries were full of broken ice, and large quantities of ice were encountered off the New Jersey coast. A report from Norfolk, Va., dated the 24th, stated that navigation in that vicinity had been stopped for two weeks, large steamers, only, being able to cut their way through.

At New Brunswick, N. J., ice in the Raritan River broke the early morning of the 2d, and carried away a temporary bridge at the foot of Albany street; 20th, ice in the Raritan River 14 inches in thickness; ice broke in Raritan Bay and the lower Raritan River. At Penns Grove, N. J., the Delaware River was closed during the month, except the west channel which was kept open by iceboats. Heavy ice interfered with navigation at Philadelphia, Pa., on the 12th.

At Washington, D. C., navigation on the Potomac River was closed by ice from the 16th to the 28th. During the cold spell which began December 20, 1892, and continued with little interruption until about January 23, 1893, the mean temperature was 21.2°, and ice formed on the Potomac River to a thickness of 13.5 inches at a point in mid-stream about one-half mile above the Aqueduct bridge.

At Clarksville, Va., the Roanoke River was frozen from the 8th to the 26th; 27th to 31st, running ice at Clarksville. At Richmond, Va., the James River was frozen from the 7th to the 26th. A report from Kittyhawk, N. C., stated that Albemarle Sound and Bay were frozen over from the 3d to the 28th, suspending navigation. On the 18th and 19th traffic at Hatteras, N. C., was suspended on account of heavy ice. At Tarboro, N. C., the Tar River was frozen over on the 19th; from the 20th to the 23d persons were crossing on the ice. At Fayetteville, N. C., navigation on the Cape Fear River was stopped by ice on the 16th; 19th, river frozen over; 27th, ice broke up. The Pee Dee River was frozen over at Cheraw, S. C., from the 14th to the 26th. Floating ice was reported in the Santee River at Saint Stephens, S. C., on the 21st and